Review Criteria and Detection Limits for Metals

The target method detection limits in soil should be used for the totals analysis, and the target method detection limit in water should be used for leachate analysis (TCLP/SPLP). The sample results are used to compute a 95% Upper Confidence Level (UCL) result for comparison to the review criteria. The total metals analysis UCL result is compared first to the Background Criteria. If all results are below background, no further analysis will be required. If the UCL result is above background, the UCL result is compared to the 20X Drinking Water Value and Direct Contact Value. If either of these values are exceeded, then the leachate testing is required and special disposal requirements are likely. The leachate analysis UCL result is compared to the Health-Based and Aesthetic Drinking Water Values. If the leachate UCL result is below the criteria and the totals analysis UCL result is below the Direct Contact Value, then the material may be authorized for unrestricted disposal. However, if the leachate UCL result is below the criteria and the totals analysis UCL result is above the Direct Contact Value, then the material will have restricted disposal requirements. Likewise, if the leachate analysis UCL result is above the applicable groundwater criteria, there also will be restricted disposal requirements. The method for computing the 95% UCL result and the method for establishing a site specific background value for a disposal area is provided in the Verification of Soil Remediation document at: http://www.deq.state.mi.us/documents/deq-wmd-hwp-versoils.pdf

	GROUNDWATER (ug/l;ppb)				SOIL (ug/kg;ppb)				
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}	Statewide Default Back-Ground (PPM)
Aluminum	ID	50 {H}	{D}	20	1,000 {C}	{C,D}	ID	500	6,900
Antimony	2.4 {C}	NA	4,300 {C,Q}	5	48 {C}	86,000	91,000	500	NA
Arsenic	0.02 {C}	NA	11 {C,Q}	1	0.4 {C}	220 {C}	720 {C}	100	5.8
Barium	2,400 {C}	NA	630 {C}	200	48,000 {C}	12,600	1.8E+7	1,000	75
Beryllium	51,000	NA	{D}	1	1.02E+06	{D}	2.10E+06	200	NA
Boron	420 {C}	NA	{D}	10	8,400 {C}	{D}	1.6E+7	2,000	NA
Cadmium	3.5 {C}	NA	0.64 {C,E}	0.2	70 {C}	{D}	1.3E+5	50	1.2
Chromium III {J}	37,000 {C}	NA	77 {C}	50	7.4E+5	1,500 {C}	3.9E+8	2,500	18
Chromium VI {J}	120 {C}	NA	7.3 {C}	1	2,400 {C}	150 {C}	1.2E+6	200	18
Cobalt	1,000	NA	2,000	10	2.00E+03	4.00E+04	2.10E+06	500	6.8
Copper	1,300 {C}	1,000	18 {C,E}	25	20,000 {C}	370 {C}	9.8E+6	1,000	32
Iron	ID	300 {C}	{D}	100	6,000 {C}	{D}	ID	2,000	12,000
Lead	4 {C,O}	NA	6.6 {C,E,Q}	3	80 {C}	130 {C}	4E+5	1,000	21
Manganese	170 {C}	50 {C}	{D}	20	1,000 {C}	{D}	1.2E+6	2,000	440
Mercury (Inorganic)	2.1 {C}	NA	0.0013 {C}	0.2	42 {C}	0.026 {C}	78,000	100	0.13
Nickel	530 {C}	NA	57 {C,E}	50	11,000 {C}	1,100 {C}	2E+7	1,000	20
Selenium	35 {C}	NA	5 {C,Q}	5	700 {C}	100 {C}	1.3E+6	500	0.41
Silver	33 {C}	100	0.1 {C}	0.5	660 {C}	2 {C}	1.2E+6	500	1
Thallium	0.58 {C}	NA	6.3 {C,Q}	2	12 {C}	130 {C}	22,000	500	NA
Vanadium	61 {C}	NA	8 {C}	20	1,200 {C}	160 {C}	2.2E+6	1,000	NA
Zinc	2,300 {C}	5,000 {C}	81 {C,E}	20	46,000 {C}	1,600 {C}	8.6E+7	1,000	47

Review Criteria and Detection Limits for PNAs and PCBs

The target method detection limits in soil should be used for the totals analysis, and the target method detection limit in water should be used for leachate analysis (TCLP/SPLP). The sample results are used to compute a 95% Upper Confidence Level (UCL) result for comparison to the review criteria. The totals analysis UCL result is compared first to the 20X Drinking Water Value and Direct Contact Value. If either of these values are exceeded, then the leachate testing is required and special disposal requirements are likely. The leachate analysis UCL result is compared to the Health-Based and Aesthetic Drinking Water Values. If the leachate UCL result is below the criteria and the totals analysis UCL result is below the Direct Contact Value, then the material may be authorized for unrestricted disposal. However, if the leachate UCL result is below the criteria and the totals analysis UCL result is above the Direct Contact Value, then the material will have restricted disposal requirements. Likewise, if the leachate analysis UCL result is above the applicable groundwater criteria, there also will be restricted disposal requirements. The method for computing the 95% UCL result and the method for establishing a site specific background value for a disposal area is provided in the Verification of Soil Remediation document at: http://www.deq.state.mi.us/documents/deq-wmd-hwp-versoils.pdf

	GROUNDWATER (ug/l;ppb)				**SOIL (ug/kg;ppb)**			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Acenaphthene	1,200	NA	{D}	5	24,000	{D}	4.5E+7	330
Acenaphthylene	25	NA	{D}	5	500	{D}	9.3E+5	330
Anthracene	7,000	NA	1.1E+5 {Q}	5	1.4E+5	2.2E+6	2.6E+8	330
Benzo(a)anthracene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Benzo(b)fluoranthene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Benzo(k)fluoranthene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Benzo(g,h,i)perylene	25	NA	{D}	5	{G}	{G}	9.3E+5	330
Benzo(a)pyrene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Chrysene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Dibenzo(a,h)anthracen	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Fluoranthene	840	NA	370 {Q}	5	17,000	7,400	3.1E+7	330
Fluorene	840	NA	14,000 {Q}	5	17,000	2.8E+5	3.1E+7	330
Indeno(1,2,3-cd)pyrene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
2-Methylnaphthalene	ID	NA	{D}	5	ID	{D}	ID	330
Naphthalene	250	NA	29	5	5,000	580	9.3E+6	330
Phenanthrene	25	NA	{D}	5	500	{D}	9.3E+5	330
Pyrene	520	NA	11,000	5	10,000	2.2E+5	1.9E+7	330
PCB's	0.018	NA	2E-5	0.2	{G}	{G}	1,000	330